REDOX REACTIONS

ONE MARK QUESTIONS

1 What do you mean by oxidation number?

2 Name a compound each in which hydrogen exists in i) +1 ii) -1 oxidation states

3 Define Redox couple.

4 Find the oxidation number of the element underlined (each carries I mark)
   a) Na₃VO₄
   b) K₂CrO₄
   c) CH₄
   d) SO₂Cl₂
   e) NO₂
   f) BrF₃
   g) Na₂S₄O₆
   i) CH₂Cl₂
   j) ClO₄⁻

TWO MARK QUESTIONS

1 Name a compound each in which oxygen exists in
   i) +1 ii) -1 iii) +2 iv) -2 oxidation states

2 Define
   i) stock notation
   i) Standard electrode potential

3 Explain the following by giving example
   i) Displacement redox reaction.
   ii) Disproportionation reactions

4 Calculate the standard emf of the following cell at 298K using the standard electrode potential. 
   Al(s) | Al³⁺(aq)‖ Fe²⁺(aq) | Fe(s)
   Given \( E^0_{\text{Al}^{3+}/\text{Al}} = -1.66 \text{ V} \) and \( E^0_{\text{Fe}^{2+}/\text{Fe}} = -0.44 \text{ V} \).
   And what will be the cell reaction?

5 What is salt bridge? What are its functions.

6 Write the cell reaction for the following Galvanic cells:
   i) Mg(s) | Mg²⁺(aq)‖ Al³⁺(aq) | Al(s)
   ii) Zn(s) | Zn²⁺(aq)‖ Ag⁺(aq) | Ag(s)

7 Balance the following equations: (each carries 2 marks)
   i) MnO₄⁻ + C₂H₂O₄ → Mn²⁺ + CO₂ [acid]
   ii) MnO₄⁻ + Br⁻ → Mn²⁺ + Br₂ [acid]
   iii) HNO₂ + I⁻ → NO + I₂ [acid]
THREE MARKS QUESTIONS

1. Identify the redox reactions and classify them.
   a. \( 2Na + H_2 \rightarrow 2NaH \)
   b. \( AgNO_3 + NaCl \rightarrow AgCl + NaNO_3 \)
   c. \( CaCO_3 \rightarrow CaO + CO_2 \)
   d. \( 2HCHO + NaOH \rightarrow HCOONa + CH_3OH \)

2. i) Predict whether the following redox reaction is feasible or not under standard conditions
   \( Sn^{2+} (aq) + Cu (s) \rightarrow Sn (s) + Cu^{2+} (aq) \)
   Given that \( E^{0}_{Sn^{2+/Sn}} = -0.136 \text{ V} \) and \( E^{0}_{Cu^{2+/Cu}} = 0.34 \text{ V} \)
   ii) Differentiate between Activity series and Electrochemical series

3. Balance the following equations: (each carries 3 marks)
   a. \( HNO_2 + I^- \rightarrow NO + I_2 \)  [acid]
   b. \( I_2 + NO_3^- + H^+ \rightarrow NO_2 + IO_3^- \)  [acid]
   c. \( Al + NO_3^- \rightarrow Al(OH)_4^- + NH_3 \)  [basic]
   d. \( CrO_3^- + H_2O_2 \rightarrow CrO_4^{2-} + H_2O \)  [basic]
   e. \( Fe(OH)_2 + H_2O_2 \rightarrow Fe(OH)_3 + H_2O \)  [basic]
   f. \( I^- + IO_3^- \rightarrow I_2 + H_2O \)  [acid]

VALUE BASED QUESTION (FOUR MARKS)

1. A solution of an electrolyte can be stored in a particular vessel only in case there is no chemical reaction taking place with the material of the vessel. The teacher asked a student Sachin, is it possible to store silver nitrate in copper vessel. Sachin answered; it is not possible to store silver nitrate in copper vessel & gave his explanation.

   i) What explanation did Sachin gave to his teacher.
   ii) What is oxidation & reduction according to electronic concept?
   iii) What are the values displayed by Sachin?

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